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(54) **CORE FOR ROLLS**

ROLLENSPINDEL

MANDRIN POUR ROULEAU

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(56) References cited:
**DE-C1- 19 718 601 US-A- 2 868 475
US-A- 4 919 358 US-A- 5 322 234
US-A- 5 513 820 US-A- 5 669 578**

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Description

[0001] The invention refers to a core for rolls of rollable and unrollable material.

[0002] It is well known that the rolls of rolled and unrollable materials for use, such as, e.g., rolls of kitchen paper or rolls of toilet paper, have a central portion, called core, that is made up of a segment of cylindrical tube made of various materials, such as cardboard or plastic.

[0003] This core is meant to act both as a support for the spirals of material, normally paper material, rolled to form the roll and as an element that can be coupled at the ends to a dispenser apparatus, so as to allow the roll to turn when a traction is applied at the free end of the rolled material to unroll a section of the latter.

[0004] This core must have a certain number of characteristics.

[0005] A first characteristic is the mechanical resistance to crushing and bending in transversal direction to the longitudinal axis of the core, to prevent, in case of crushing, because the diameter of the transversal section of the core is reduced, the spirals forming the roll from disuniting and slipping the one on the other due to a lack of the radial compression force which is generated between the spirals during the rolling of the material to form the roll.

[0006] In this case, if the roll of rollable material is fitted in a dispensing device that requires the material to pass through a thin dispenser opening, the operation of this dispensing device can be stopped.

[0007] A second characteristic which the cores for rolls must have is a very low cost, because these are "disposable" material, meaning intended to be thrown away after the roll of rolled material is finished: for this reason, the cores are made from low-cost materials, such as cardboard or plastic, keeping thicknesses as thin as possible.

[0008] To prevent transversal yielding, despite the considerable reduction of thicknesses, cores are currently made that comprise a pair of concentric tubular bodies that are joined together by a series of transversal stiffening ribs which develop between the outer surface of the inner tubular body and the inner surface of the outer tubular body.

[0009] A core of this type is described in the Italian patent for Utility Model no. 246.741 registered on 19.05.1999 in the name of the applicant.

[0010] This core, though having a high mechanical resistance in a transversal direction, does however have a number of drawbacks.

[0011] The state of the art comprises also documents US4919358A, US5513820A and US5669578A.

[0012] Document US4919358A discloses a rewind shell for the textile industry, the shell comprises radially extending webs arranged in an angularly displaced array symmetrically about a common longitudinal axis of the rewind shell, the webs each having flanges at their radially outer edges curved about a radius of the common longitudinal axis, the webs and flanges being formed in-

tegrally as a unitary metal extrusion.

[0013] Document US5513820A discloses a core plug apparatus for roll of material comprising an outer wall, an inner hub, a middle strengthening ring, and a plurality of interconnecting vanes.

[0014] Document US5669578A discloses a core for supporting paper products comprising a coaxial inner and outer tubes having a plurality of ribs extending therebetween defining a plurality of empty pockets. The inner tube has a thickness which is at least as large as the thickness of the outer tube for increasing crushing resistance of the core. This latter document is considered as the closest prior art.

[0015] A first drawback is the possibility that in certain conditions of use, the joining ribs between the outer tubular body and the inner tubular body bend, causing the outer tubular body to fold in on the inner one.

[0016] If, at the same time as this bending, an intense traction is applied to the rolled material, the inner tubular body, which is the only one to provide mechanical resistance in a transversal direction, also bends and inside the core the drawbacks again occur relating to the decomposition of the spirals of material of the roll affecting known cores made up of simple tubular bodies.

[0017] Furthermore, if the roll is fitted in a dispensing device, the ends of the core come away from the sustaining supports and the roll falls from the dispensing position blocking the latter and requiring the intervention of a maintenance operator to restore the operation of the dispensing device.

[0018] This bending of the stiffening ribs can occur by applying a twisting force between the outer and inner tubular bodies.

[0019] This twisting force is generated when together with the application of an excessive force of traction on the rolled material, which is transmitted on the outer tubular body, the inner tubular body is prevented or hindered in its free rotation on the supports intended to sustain it.

[0020] This possibility of rib bending increases in the cores made of cardboard and whenever the rolls of rolled material are positioned for use in very damp environments; the humidity is absorbed by the core which is therefore mechanically weakened.

[0021] Plastic cores also have the same problem, when the ribs and the concentric tubular bodies have very limited thicknesses to cut the production costs determined by the material.

[0022] A second drawback of the known cores is that they permit making rolls that have a limited number of spirals of rolled material, because of the limited thicknesses of the materials, and therefore, as has been said, of their low mechanical resistance, and of the overall transversal dimensions the known cores must have to be able in any case to mechanically resist deformations and to sustain, without problems, a limited and predetermined number of spirals.

[0023] One object of the invention is to improve the

prior art.

[0024] Another object of the invention is to make a core for rolls of rollable material that has a mechanical resistance to the transversal deformation considerably greater than that of known cores and which maintains the possibility of unrolling the rolled material substantially intact.

[0025] A further object of the invention is to make a core for rolls of rollable material that allows rolling a greater number of spirals of material than that currently possible.

[0026] According to the invention, a core is provided for rolls of rollable and unrollable material, comprising: the features of independent claim 1.

[0027] The core for rolls of rollable and unrollable material permits avoiding crushing in directions transversal to the longitudinal axis and, consequently, the blockage of the rotation of rolls on the supports intended to sustain the core.

[0028] The core for rolls further permits being made with inexpensive materials that have very limited thicknesses.

[0029] Further characteristics and advantages of the invention will appear more evident from the description of an embodiment of a core for rolls of rollable and unrollable material, illustrated indicatively by way of non limiting example, in the attached drawings wherein:

Figure 1 is a perspective view of a first embodiment of a core for rolls of rollable and unrollable material; Figure 2 is a front view of the core of Figure 1;

Figure 3 is a perspective view of a second embodiment of a core for rolls of rollable and unrollable material;

Figure 4 is a front view of the core of Figure 3;

Figure 5 is a perspective view of a third embodiment of a core for rolls of rollable and unrollable material;

Figure 6 is a front view of the core of Figure 5.

[0030] With reference to the Figures, it will be noticed that the core 1 for rolls of rollable and unrollable material comprises a first outer tubular body 2 and a second inner tubular body 3, coaxial with the first outer tubular body 2.

[0031] Normally, the latter has a cylindrical shape and a round cross section, while the second inner tubular body 3 can also have a round cross section, as shown in Figure 2, or a polygonal cross section, as shown in Figures from 3 to 6, in which the cross section of the second inner tubular body unit 3 is, by way of example, quadrangular and, more specifically, square, without however ruling out the possibility that this section can have the perimeter of other polygons with several sides. The outer tubular body 2 could also have a polygonal cross section.

[0032] Between the first outer body 2 and the second inner body 3, connection ribs 4 are provided, all radially directed and opposite two by two, so as to define a position plane "P" between each pair of opposite ribs 4.

[0033] According to a first embodiment of the core 1

for rolls of rollable and unrollable material, shown in the Figures 1 and 2, between the two ribs 4 a second rib 5 is arranged diametrically inside the second tubular body 3, which, in point of fact, represents a second rib 5 joining two opposite ribs 4 lying on the same position plane "P". Said at least one inner diametral rib 5 is straight.

[0034] According to another embodiment of a core for rolls of rollable and unrollable material shown in Figures 3 and 4 and indicated by 100 to distinguish it from the previous core 1, this again comprises a first outer tubular body 200 and a second concentric inner tubular body 300, which has a square cross section and which is connected to the first outer tubular body 200 by means of radially directed first ribs 400. The outer tubular body 200 could also have a polygonal cross section.

[0035] In this second embodiment as well, the second inner tubular body 300 internally has at least one second rib 500 that joins two alternate vertices and two first ribs 400 opposite one another and which are on a common position plane "P". Said at least one inner diametral rib 500 is straight.

[0036] In the further embodiment of the core for rolls of rollable and unrollable material, indicated by 600, it will be noticed that this is substantially the same as the embodiment shown in Figures 3 and 4, but has a third rib 700 that perpendicularly intersects the second rib 500 and which, practically, joins the other two first ribs 400 which, in the embodiment illustrated in the Figures 3 and 4 lie on a common position plane "P", but are separated from each other.

[0037] The core for rolls of rollable and unrollable material therefore has one or more second and third ribs, 500 and 700 respectively, that stiffen the pairs of first ribs 4 and 400 in a longitudinal direction and both the second inner tubular body 3, or 300, and the first outer tubular body 2, or 200, in a transversal direction, both preventing the bending of one with respect to the other, and that crushing occurs in a transversal direction such as to break up the roll formed on the first outer tubular body.

[0038] This mechanical resistance in transversal direction of the outer tubular body 2, or 200, and of the inner tubular body 3, or 300, also allows increasing the number of spirals of rollable and unrollable material and reducing the thicknesses of the materials used to make the core for rolls.

[0039] The ends of the latter can be coupled with rotating bilateral supports, e.g. of dispensing devices, ready to be coupled in a conjugated way with the second and third ribs 5, 500 and 700, having, e.g., pre-made cuts to receive the latter.

Claims

1. Core for rolls of rollable and unrollable material, comprising: outer tubular means (2; 200) and inner tubular means (3; 300), concentric with said outer tubular means (2; 200); connection ribs (4; 400) placed

in between said outer tubular means (2; 200) and inner tubular means (3; 300), said inner tubular means (3; 300) having at least one inner diametral rib (5; 500), **characterized in that** at least said one inner diametral rib (5; 500) is arranged between two connection ribs (4; 400) diametrically inside said inner tubular means (3; 300), said inner diametral rib (5; 500) joining two opposite connection ribs (4; 400) lying on a same position plane (P).

2. Core according to claim 1, wherein said at least one inner diametral rib (5; 500) lies on said position plane (P) defined by the two opposite connection ribs (4; 400).
3. Core according to claim 1, wherein said at least one inner diametral rib (5; 500) is straight.
4. Core according to claims 2 or 3, wherein said at least one inner diametral rib (5; 500) is aligned to said two opposite connection ribs (4; 400).
5. Core according to any of the claims from 1 to 4, wherein said inner tubular means (3; 300) have further inner diametral ribs (700) which intersect along a longitudinal axis of said inner tubular means (3; 300) said at least one inner diametral rib (5; 500).
6. Core according to claim 5, wherein at least one of said further inner diametral ribs (700) is aligned to respective pairs of further opposite connection ribs (400).
7. Core according to any of the claims from 1 to 6, wherein said outer tubular means (2; 200) have round cross section.
8. Core according to any of the claims from 1 to 6, wherein said outer tubular means (2; 200) have polygonal cross section.
9. Core according to any of the claims from 1 to 6, wherein said inner tubular means (3) have round cross section.
10. Core according to any of the claims from 1 to 6, wherein said inner tubular means (300) have polygonal cross section.
11. Core according to claim 10, wherein said connection ribs (400) extend radially from vertices of said polygonal section of said inner tubular means (300).

Patentansprüche

1. Kern für Rollen von rollbarem und abrollbarem Material, umfassend: äußere rohrförmige Mittel (2; 200)

und innere rohrförmige Mittel (3; 300), konzentrisch zu den äußeren rohrförmigen Mitteln (2; 200); Verbindungsrippen (4; 400), die zwischen den besagten äußeren rohrförmigen Mitteln (2; 200) und inneren rohrförmigen Mitteln (3; 300) angeordnet sind, wobei die besagten inneren rohrförmigen Mittel (3; 300) mindestens eine innere diametrale Rippe (5; 500) aufweisen, **dadurch gekennzeichnet, dass** mindestens die besagte eine innere diametrale Rippe (5; 500) zwischen zwei Verbindungsrippen (4; 400) diametral innerhalb der besagten inneren rohrförmigen Mittel (3; 300) angeordnet ist, wobei die besagte innere diametrale Rippe (5; 500) zwei gegenüberliegende Verbindungsrippen (4; 400) verbindet, die auf einer gleichen Positionsebene (P) liegen.

2. Kern nach Anspruch 1, worin die besagte mindestens eine innere diametrale Rippe (5; 500) auf der besagten Positionsebene (P) liegt, die durch die zwei gegenüberliegenden Verbindungsrippen (4; 400) definiert ist.
3. Kern nach Anspruch 1, worin die besagte mindestens eine innere diametrale Rippe (5; 500) gerade ist.
4. Kern nach den Ansprüchen 2 oder 3, worin die besagte mindestens eine innere diametrale Rippe (5; 500) mit den besagten zwei gegenüberliegenden Verbindungsrippen (4; 400) ausgerichtet ist.
5. Kern nach irgendeinem der Ansprüche von 1 bis 4, worin die besagten inneren rohrförmigen Mittel (3; 300) weitere innere diametrale Rippen (700) aufweisen, die sich entlang einer Längsachse der besagten inneren rohrförmigen Mittel (3; 300) der besagten mindestens einen inneren diametralen Rippe (5; 500) schneiden.
6. Kern nach Anspruch 5, worin mindestens eine der besagten weiteren inneren diametralen Rippen (700) mit entsprechenden Paaren von weiteren gegenüberliegenden Verbindungsrippen (400) ausgerichtet ist.
7. Kern nach irgendeinem der Ansprüche von 1 bis 6, worin die besagten äußeren rohrförmigen Mittel (2; 200) einen runden Querschnitt aufweisen.
8. Kern nach irgendeinem der Ansprüche von 1 bis 6, worin die besagten äußeren Rohrmittel (2; 200) einen polygonalen Querschnitt aufweisen.
9. Kern nach irgendeinem der Ansprüche von 1 bis 6, worin die besagten inneren rohrförmigen Mittel (3) einen runden Querschnitt aufweisen.
10. Kern nach irgendeinem der vorangegangenen Ansprüche von 1 bis 6, worin die besagten inneren rohr-

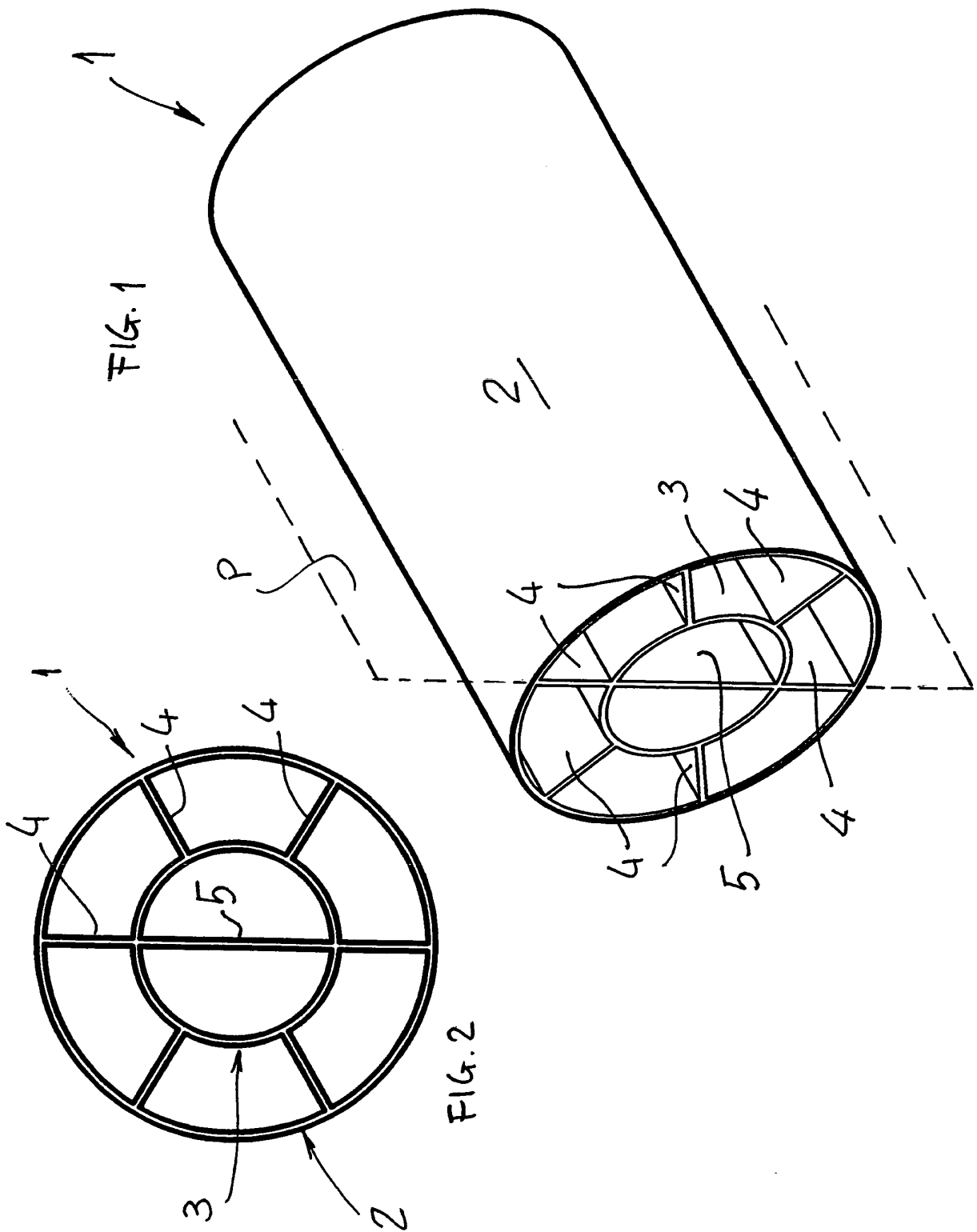
förmigen Mittel (300) einen polygonalen Querschnitt aufweisen.

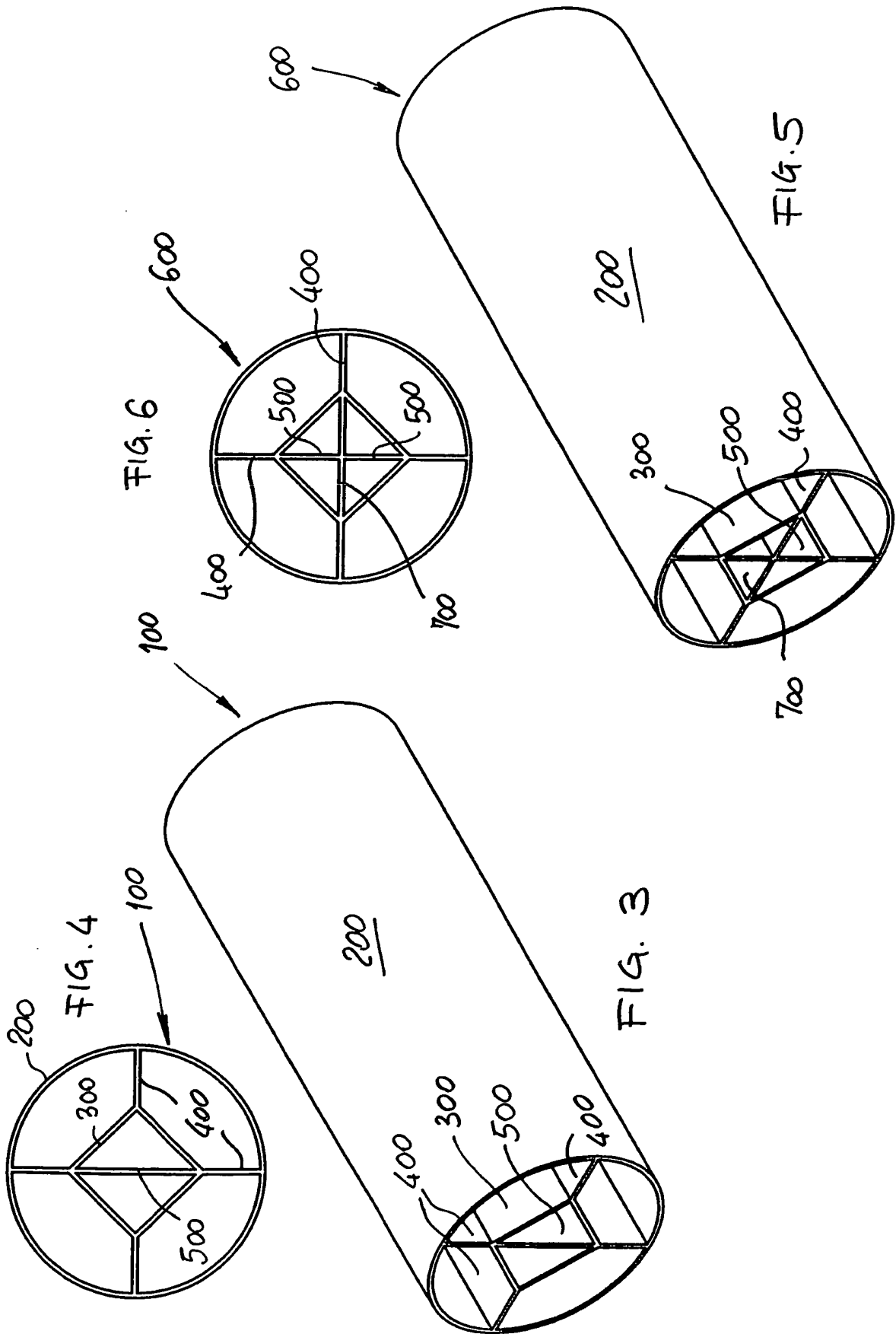
11. Kern nach Anspruch 10, worin sich die besagten Verbindungsrippen (400) radial von den Eckpunkten des besagten polygonalen Abschnitts der besagten inneren rohrförmigen Mittel (300) erstrecken.

Revendications

1. Mandrin pour rouleaux de matière enroulable et déroulable, comprenant : des moyens tubulaires extérieurs (2 ; 200) et des moyens tubulaires intérieurs (3 ; 300), concentriques avec lesdits moyens tubulaires extérieurs (2 ; 200) ; des nervures de raccordement (4 ; 400) placées entre lesdits moyens tubulaires extérieurs (2 ; 200) et lesdits moyens tubulaires intérieurs (3 ; 300), lesdits moyens tubulaires intérieurs (3 ; 300) comportant au moins une nervure diamétrale intérieure (5 ; 500), **caractérisé en ce qu'**au moins ladite une nervure diamétrale intérieure (5 ; 500) est agencée entre deux nervures de raccordement (4 ; 400) diamétralement à l'intérieur desdits moyens tubulaires intérieurs (3 ; 300), ladite nervure diamétrale intérieure (5 ; 500) joignant deux nervures de raccordement (4 ; 400) opposées reposant sur un même plan de positionnement (P).
2. Mandrin selon la revendication 1, dans lequel ladite au moins une nervure diamétrale intérieure (5 ; 500) repose sur ledit plan de positionnement (P) défini par les deux nervures de raccordement (4 ; 400) opposées.
3. Mandrin selon la revendication 1, dans lequel ladite au moins une nervure diamétrale intérieure (5 ; 500) est droite.
4. Mandrin selon la revendication 2 ou 3, dans lequel ladite au moins une nervure diamétrale intérieure (5 ; 500) est alignée sur lesdites deux nervures de raccordement (4 ; 400) opposées.
5. Mandrin selon l'une quelconque des revendications 1 à 4, dans lequel lesdits moyens tubulaires intérieurs (3 ; 300) comportent d'autres nervures diamétrales intérieures (700) qui croisent le long d'un axe longitudinal desdits moyens tubulaires intérieurs (3 ; 300) ladite au moins une nervure diamétrale intérieure (5 ; 500).
6. Mandrin selon la revendication 5, dans lequel au moins l'une desdites autres nervures diamétrales intérieures (700) est alignée sur les paires respectives de nervures de raccordement (400) opposées supplémentaires.

7. Mandrin selon l'une quelconque des revendications 1 à 6, dans lequel lesdits moyens tubulaires extérieurs (2 ; 200) ont une section transversale ronde.
8. Mandrin selon l'une quelconque des revendications 1 à 6, dans lequel lesdits moyens tubulaires extérieurs (2 ; 200) ont une section transversale polygonale.
9. Mandrin selon l'une quelconque des revendications 1 à 6, dans lequel lesdits moyens tubulaires intérieurs (3) ont une section transversale ronde.
10. Mandrin selon l'une quelconque des revendications 1 à 6, dans lequel lesdits moyens tubulaires intérieurs (300) ont une section transversale polygonale.
11. Mandrin selon la revendication 10, dans lequel lesdites nervures de raccordement (400) s'étendent radialement depuis les sommets de ladite section polygonale desdits moyens tubulaires intérieurs (300).





REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- IT 246741 [0009]
- US 4919358 A [0011] [0012]
- US 5513820 A [0011] [0013]
- US 5669578 A [0011] [0014]